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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 10/821,508 | 04/09/2004 | Osamu Nozawa | 0524-0139.02 | 9824 |

7590 10/03/2006

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EXAMINER

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| ART UNIT | PAPER NUMBER |
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1753

DATE MAILED: 10/03/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/821,508

Applicant(s)

NOZAWA ET AL.

Examiner

Rodney G. McDonald

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 July 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 6,7,9,12-16 and 26-36 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 6,7,9,12-16,26,27 and 33-36 is/are allowed.
- 6) ☒ Claim(s) 28-32 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☒ Certified copies of the priority documents have been received in Application No. 09/952,445.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date <u>5-2006</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 28-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tu et al. (U.S. Pat. 5,714,285) in view of Yamanishi et al. (U.S. Pat. 5,626,727) and Satoshi (Japan 10-2000).

Regarding claim 28, Tu et al. teach form a photomask blank having at least a thin film for forming a pattern on a transparent substrate. (See Abstract) The process comprises setting a substrate 22 in a horizontal position where a surface of the substrate and a surface of a sputtering target are in opposed positions with a center axis of the target deviating from the center axis of the substrate surface. (See Figure 5;

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Column 4 lines 4-35) The target and the substrate from a predetermined angle therebetween. (See Figure 5)

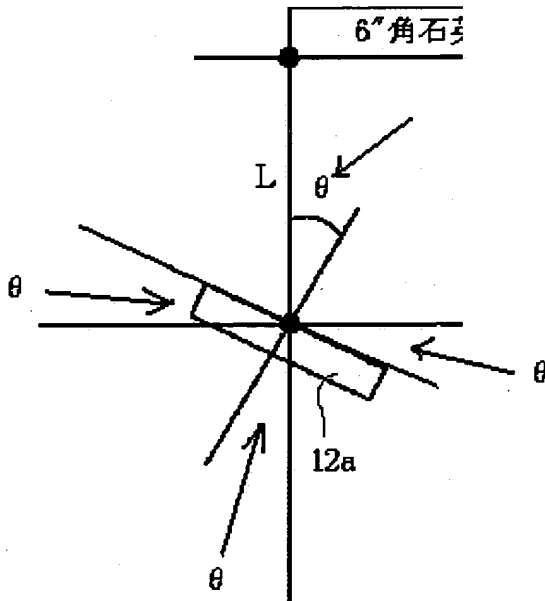
Regarding claim 29, the film is a phase shifting film produced by sputtering on a phase shift mask blank. (See Abstract; Column 4 lines 4-35)

The differences between Tu et al. and the present claims is that rotating the substrate around its center axis is not discussed (Claim 28), the angle being at an angle between 10 to 15 degrees is not discussed (Claim 28), and the dispersion angle of the phase shift film is not discussed (Claim 30).

Regarding the rotating (Claim 28), Yamanishi et al. teach rotating a substrate holder when opposed to targets offset from the axis of the substrate and angled thereto. (Column 7 lines 17-31)

The motivation for utilizing a rotating substrate holder is that it allows for controlling the uniformity of the thin film deposited. (Column 7 lines 17-25)

Regarding the angle (Claim 28), Satoshi teach providing the opposite surface of the substrate and the target at 10 to 60 degrees for forming photomask blanks. (See Machine Translation 0015; Fig. 4; Annotated Fig. 4 below)



The motivation for utilizing a particular angle is that it allows for improving the distribution of the film in the plane of the substrate. (See Abstract)

Regarding the dispersion angle of the phase shift film (Claim 30), since Yamanishi et al. suggest rotation which creates a uniform film the dispersion angle produced in a phase shift film when rotated will be within applicant's limits.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Tu et al. by utilizing a rotating substrate holder as taught by Yamanishi et al. and to have utilized a particular angle as taught by Satoshi because it allows for controlling the uniformity of the thin film deposited and allows for controlling the distribution of the film in the plane of the substrate.

Claims 31 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tu et al. in view of Yamanishi et al. and Satoshi as applied to claims 28-30 above, and further in view of Mitsui et al. (U.S. Pat. 5,955,223).

The differences not yet discussed is the formation of a light semi-transmission phase shift film (Claim 31), the dispersion of a phase angle and a dispersion of a transmittance (Claim 32).

Regarding claim 31, Mitsui et al. teach forming a light semi-transmission phase shift film by sputtering. (Column 8 lines 49-56)

Regarding claim 32, as discussed above by rotating the substrate one can control the dispersion of phase angle and dispersion of transmittance. (See Yamanishi et al. discussed above)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have formed a light semi-transmission phase shift film with controlled dispersion phase angle and dispersion transmittance formed of metal silicon and nitrogen with more nitrogen than silicon as taught by Mitsui et al. because it allows for forming a semi-transmitting film.

Allowable Subject Matter

Claims 6, 7, 9, 12-16, 26, 27 and 33-36 are allowed.

The following is a statement of reasons for the indication of allowable subject matter:

Claims 6, 7, 9, 12-16, 26 and 27 are allowable over the prior art of record because the prior art of record does not teach setting the substrate in a horizontal position where a surface of the substrate on which the thin film is formed and a surface of a sputtering target are in opposed position with a center axis of the target deviating from a center axis of the substrate surface and sputtering the target while rotating the

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substrate around its center axis so as to form the thin film, wherein the forming of the thin film is controlled so as to make the rotation number during the film formation an integer.

Claims 33 and 34 are allowable over the prior art of record because the prior art of record does not teach setting a substrate in a horizontal position where a surface of the substrate on which the thin film is formed and a surface of a sputtering target are in opposed position with a center axis of the target deviating from a center axis of the substrate surface, and sputtering the target while rotating the substrate around its center axis so as to form the thin film, wherein, when the substrate has a size of one side 152 mm of square, an offset distance is 200 to 350 mm, and T/S value is 200 to 380 mm, the offset distance being a distance between a center axis of the substrate and a straight line passing through a center of the target and extended in parallel to the center axis of the substrate, and T/S value being a vertical distance between the target and the substrate.

Claims 35 and 36 are allowable over the prior art of record because the prior art of record does not teach setting a substrate in a horizontal position where a surface of the substrate on which the thin film is formed and a surface of a sputtering target are in opposed position with a center axis of said target deviating from a center axis of the substrate surface, and sputtering the target while rotating the substrate around its center axis so as to form the thin film, wherein the rotation of the substrate is controlled so as to make the rotation number during the film formation an integer by detecting a rotation angle from the start up to the end of the film formation.

Response to Arguments

Applicant's arguments filed July 13, 2006 have been fully considered but they are not persuasive.

In response to the argument that the angle is not discussed by the prior art, it is argued that Satoshi teach providing an angle to be between 10 to 60 degrees as discussed above. Since 10 degrees falls within Applicant's range this is believed to suggest the claimed subject matter. (See Satoshi discussed above)

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rodney G. McDonald whose telephone number is 571-272-1340. The examiner can normally be reached on M- Th with Every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam X. Nguyen can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Rodney G. McDonald
Primary Examiner
Art Unit 1753

RM
September 27, 2006